Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the matter of:

Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Digital Low Power Television, Television Translator, and Television Booster Stations and to Amend Rules For Digital Class A Television Stations	)))))	MB Docket No. 03-185

COMMENTS OF R. KENT PARSONS
STATE OF UTAH TELEVISION TRANSLATOR COORDINATOR

R. Kent Parsons hereby submits comments in the above-captioned proceeding.[1]

HISTORY

The State of Utah has been a leader in providing television to their rural populace, via Television translator stations, since 1957. The translator network continued to grow and provide additional local broadcast television signals, on a regular basis, as the services were needed. Approximately 1/6 of our 600 translators are Corporation Public Broadcasting (CPB)-qualified PBS educational stations.

From 1955 to 1979, TV translator applicants could file "at will" for new translator stations. In 1980 the FCC announced an NPRM to create a new service to enhance the existing translator service. This new service would be called Low Power Television and was intended to originate local programming for small rural communities. The new rules were included with the translator service and adopted in 1982 and a new filing window was then opened. Consequently, entrepreneurs and speculators filed thousands of applications. This completely overwhelmed the commission process and all future filing applications were frozen. Rural communities had to wait until the Commission could process the backlog of existing applications. In 1987, the Commission adopted a new method of filing for translators, low power stations and modification to existing stations. This was to be accomplished during a five-day filing window and limited each applicant to a maximum of five applications. Underserved rural communities, which lacked the

[1] R. Kent Parsons is the Television Translator Coordinator for the State of Utah and represents the coordination of the documented 600 TV translators in the State (approx. one tenth of the nations TV translator stations'). For the past two and a half years, with authority from the FCC, he has been performing both analog and digital TV testing for the purpose of discovering new methods of spectrum management in order to provide channels for the rural viewers in this nation and to include them in the transition to the new digital world. He also has been engineering, installing and maintaining Translator stations, throughout the State of Utah, for the past 46 years. He was a full time employee of the University of Utah for 38 years and retired from the U of U on May 31, 2003.

economic means of hiring communications consultants or lawyers, now had to compete with the entrepreneurs and speculators for spectrum.

The results of this massive filing window again produced thousands of applications and as a consequence, additional future applications were again frozen. After two more years of waiting, another five-day window was opened in 1989, resulting in yet another landslide of applications. A third five-day window was opened in 1991 and a forth window in 1992. The Commission accepted the fifth window for new and modification applications in 1994. In 1996, the Commission opened a five-day window accepting modification of **existing** Translator and LPTV stations only, with no opportunity to file for new stations. Four more long years passed before another window would allow filing for new translator stations. August 2000 saw the last window for filing new or modification for translators; over 4700 applications were received in this window and, as of this date, many of these applications still have not been processed.

The inescapable conclusion is: Only six opportunities, for filing new TV translator stations to serve rural communities, is all that has been allowed during the past 23 years and services to Rural America has been greatly curtailed!

The FCC has accepted public comments for FCC document RM-10666, which requests the Commission to establish a Rural Translator Service. I understand the FCC has completed both the Public Comment Period and the Reply Comment Period for this National Translator Association request. I also understand that out of 46 public responses, only two were actually negative.

The acceptance of RM-10666 would exempt translator applicants from auction and allow them to file for new stations including digital on a daily basis, which is absolutely necessary if rural viewers are to maintain their service during the digital conversion.

I have been informed that no further FCC action is underway to further pursue this request.

Therefore, these comments will only address the urgent needs of the Truly Rural Communities who do not receive direct television reception from local full power primary stations. Consequently, they depend on television translator stations for network programming, local news, weather and emergency information.

To protect the interests of local reception to the hinterlands of this country, mass speculative filings must not continue as it has little worth to the truly rural communities while consuming most of the commission's application processing time.

CPB-qualified noncommercial educational programming is greatly appreciated in rural areas, and the constant delays of filing windows have definitely impeded this service. In the past, local governmental groups and non-profit organizations have relied on State and Federal grants to help provide PBS to their viewers.

A high percentage of the population in the state of Utah has access to free-over-the-air PBS stations. However, many areas of this country do not. In order to apply for any grants, the applicant must have a construction permit for each new application and include this authorization with the request.

During the past 45 years, Utah has built a massive translator system through constant statewide coordination. However, there are still some small communities in this state (and other parts of the country) that remain without a full compliment of PBS and local commercial broadcast reception. It has become increasing more difficult for local translator groups to file applications, in competition with huge distant applicants, while the spectrum continually shrinks. Establishing rules for translator stations must promote universal service but also must limit speculative applications.

In this regard, I agree that CPB-qualified translator stations repeating a broadcast signal delivered via satellite, should qualify for licensing in the rural translator service. However, to accommodate CPB-qualified NCE state systems that do use satellites to deliver quality noncommercial educational services to rural Americans, I propose that translators owned and operated by a state, a political or special purpose subdivision of a state or a public agency should be eligible to be licensed in the service. In addition, I agree with a proposal that to be eligible to apply to operate in a rural translator area, an applicant must propose a translator that will provide a signal to an **underserved** area and only to that area, as requested by American Public Television Stations (APTS).

Re: National Translator Association's request for a "Rural Translator Service":

It has been suggested that any community or area that receives less than four primary signals be considered as rural. I believe this number is too large, and a better definition to consider is: "any rural community or area totally dependent on translators for their local television programming is rural". However, just because a borderline community has one or two local primary broadcast stations, they should also have some consideration for additional services from translators to provide a full compliment of their local broadcast station programming. It takes a good-sized city to support three or more full power broadcast stations.

I propose the following definition for Truly Rural Service; "An Underserved community or area to mean one in which residents are unable to receive direct subscription-free primary TV stations". CPB-qualified TV translator stations would be excluded and that translator would qualify for this new service. An applicant may also qualify for this service and use satellite delivery if it is for a CPB-qualified signal and provides a "First Time Service" to that community.

The National Telecommunications and Information Administration (NTIA) is a Federal Agency that accepts and reviews applications for federal grants in request for assistance for funding telecommunications to communities of need in the U.S. One of their mandates is to look closely at requests for CPB-qualified applicants to provide "First Time Service" for primary and/or translator stations. Their guidelines for making

these decisions are already in place and could also be used for the delivery of public television.

On April 30, 2003, NTIA announced $25 million for FY 2003 for Public TV to aid in the transition from analog to digital. This could mean any community or area that does not have an existing CPB-qualified-PBS station would be eligible to file on any given day for any available channel, if we had a rolling one-day filing window. Because of the remote areas of concern and dire need for the delivery of a public broadcast signal, satellite delivery would be permitted in the definition for this service only.

This should fulfill the Federal Law and Policy for public television
to provide a universal service.

New additional information was needed, as no actual field tests have ever been made using DTV translators operating in a single mode or in a "Daisy Chain" configuration. Also, would these signals hold without propagation error through all days and seasons of the year? It was also important to verify if technology is presently available, dependable, and most of all, affordable. This would be needed if uninterrupted DTV service to rural America were to be achieved.

Rural viewers deserve the full compliment of the 8VSB technology, which includes High Definition, Multi-programming and Ancillary Data Services.

Some field experimental research had to be done!

After Sevier County and the University of Utah made requests to the FCC, the commission granted experimental authority to proceed, using 8VSB digital translators. This would be for the purpose of determining technical parameters relating to the deliverance of television signals to the rural populace and these authorizations would be dedicated for experimental purposes. The input signals at the first existing site would be received 83 miles from the primary stations and not line-of-site. The second site is located 60 miles further and is line-of-site with the first site (Daisy Chain). Both sites are within the boundaries of Utah and the DTV reception would then be monitored in the Sevier Valley area, 150 miles from the primary stations.

The FCC granted these requests and assigned individual call letters for each DTV translator. Experimental authority requires a detailed report to the FCC of the finding results of these tests. The results of the early tests have been submitted to the FCC.
("Digital Translator Testing In Rural Utah" delivered in April 2002)

Actual field tests were needed to provide valuable information
for new DTV rules to address the following:

1… Spurious emission masks for much lower power translators
2… Translator output power
3….Station identifcation

4….Transcoders, which regenerate the signals
5….Heterodyne processors, which do not regenerate the signals
6….Acceptability of older analog translators for digital transmission
7….Utilizing set-top-box converters to convert 8VSB signals to video and audio for the purpose of improving the input signal to an analog translator.

It was evident that one would have to think "out-of-the-box" from the ordinary, and to seek methods of squeezing in more channels into the already diminished channel core spectrum. Staff members of the Mass Media Services gave some encouragement for this thought.

Many people were involved in the planning, implementation and documentation of this two and a half year test and experiment. Without the constant help of my two sons, Mauri and Johnny and also my grandson Reggie, none of this could have taken place.

Others who greatly contributed are as follows:

The University of Utah supplied a good portion of my time and mileage, while I was an employee, for this experiment.

The Utah Digital Broadcasters are very cooperative and patient in fielding our many phone calls regarding our direct input signals.

Larcan /USA contributed much of the needed transcoders, new MX series translator amplifiers and other misc. electronic equipment.

Zenith sent Bruce Zediker, one of their engineers from Chicago to Salt Lake City where I picked him up and then proceeded to drive by auto to the Levan TV Translator Site. Ron Titcomb and Dennis Johnson from the University of Utah met us at the base of the mountain with snowmobiles. The sleds were needed to transport all of us to the 8750 ft. AMSL mountaintop. Needed test equipment was loaded onto a toboggan and towed behind the sleds to the snowy top.

Zenith Corp. also supplied me with a very valuable professional DTV demodulator for test purposes.

Gary Sgrignoli was later sent out from Chicago by Zenith to evaluate and substantiate our findings. He personally visited and evaluated the translators at the Levan, Cove Mountain and Monroe Peak Sites.

Communications with Ed Williams from PBS was continually maintained, as we needed his expertise to help us proceed from time to time.

Clark Rhodes from Microwave Radio Corp. was also present at the Levan Site when we made tests with 8VSB signals on the microwave. Phil Titus from the University of Utah was also supportive and present during the first microwave tests.

Brent Robinson from Bonneville Corporation, an NBC affiliate located in Salt Lake City, visited the Levan and Cove sites to also witness our progress.

Thousands of man-hours along with thousands of miles traveled have contributed to these ongoing tests and experiments.

EXPERIMENTAL TEST CONCLUSIONS:

I believe there will be a significant difference between LPTV stations and translator stations when they change to digital operation. It is evident to me that these different services should no longer be governed with the same rules.

A substantial financial investment will be needed for an originating LPTV station to encode and purchase studio equipment, which will be needed to change the stations to digital operation. Normally, these stations are located in or near the more populated urban areas of the country, with few being located on remote mountaintops.

Translators "pass through" a received signal from a local primary source only. This does not require the expensive encoding and other supporting studio equipment.

In addition, a high percentage of the translators are co-located and are found on remote mountaintops. Additional studio transmitter links (STL) would also be required if the translators were to originate programming and very few translator stations would ever be able to afford this kind of operation.

My Comments of the FCC Request for Rule Making

The following is from my personal experience with TV Translator Stations:

Page 2 par. 2 of the NPRM

We have successfully transmitted two 8VSB adjacent channels on a single Larcan/USA, model MX 100 broadband translator. Transcoders were used to regenerate the receive channels 38 and 42 and change them to 16 & 17. The output mask was designed and built by Microwave Filter Company and was swept for 12 MHz bandwidth. The measured output power was 12 watts for each channel (24 watts total translator output power).

To expedite authorization of service, an LPTV and translator applicant should be permitted to convert to digital on their *existing* analog channel by applying for a minor change with a translator output power reduction of 6 dB. i.e.; 100-Watt (peak) analog translator reduced to 25 Watts (average) digital power output**. I propose this would be on a first come-first serve basis while certifying there will be no interference to any other service.**

Page 3 par. 4 of the NPRM

Many LPTV stations are not originating local programming and are operating as a translator station. I believe this distorts the actual number of LPTV stations and should be clarified.

Page 4 par. 5 of the NPRM

The Commission has already set a precedent with the addition of a Class A LPTV Service and should consider identifying a better way for serving rural communities.

Page 4 par. 6 of the NPRM

It is stated, "There are approximately 4700 licensed TV translators, most operating in the western regions of the country. These stations are often used to deliver the only free off-air television service available to rural communities". A high majority of authorized analog translators are, in fact, located in the west, and the following approximate examples were derived from a recent fact book. LPTV stations operating as translators are not included in these numbers:

Colorado……620
Utah ……..600
Alaska……561
California..…454
Oregon…..…406
Montana……357
Nevada……..315
New Mexico..291
Texas…….277
Minnesota…..276
Washington…253
Idaho……..244
Wyoming…...182
total 4836

Page 4 par. 7 of the NPRM

An LPTV station, not originating programming and operating as a translator, should also be identified as a broadcast translator. This total number would then increase to approximately 6000.

Page 4 par. 8 of the NPRM

In the late 1950's and early 1960's, on-channel TV boosters were used to provide television to small communities located beyond the coverage of the primary stations. Local technicians, ranchers, and farmers etc. were the experimenters. I was a farmer. The major problem was feedback, resulting in regeneration. While it is true DTV offers more isolation, the power that is being considered is much higher than the early one hundred milliwatt to one-Watt amplifiers and the problem of regeneration still exists. To my knowledge, no one has installed and operated one of these new DTV Boosters through all seasons of the year. Also one assumes the primary stations will always be at

100 percent power. This simply is not the case as we have experienced primary power reduction down to 5%.

If the amplifiers were fed with another source of 8VSB, such as microwave, using a different input channel rather than the on channel signal, the feedback problem disappears. If the input signal is other than the same primary channel, then this transmission is the same as a translator and should be designated as such. The term Single Frequency Network (SFN) seems to be drifting toward this method. In my opinion, this is the right way to provide an input signal for retransmission into the primary stations protected contour.

Page 5 par. 10 of the NPRM

I do not envision translators being able to do any local insertion, as the process is too complicated in interrupting the bit steam.

Page 6 & 7 par. 13 of the NPRM

A primary station's single analog program can be greatly improved by using their companion digital signal for input to the translator. This is accomplished by receiving their DTV signal with a set-top-box receiver, selecting the identical analog program, modulating the composite video and audio signals to provide the same initial programming for the translator.

Page 8 par. 13 of the NPRM

A translator station should not alter the primary station program(s), but rather only pass through their program(s). An LPTV station would be a better candidate for changing the main primary station signal.

Page 8 Par. 14 of the NPRM

Our experiments have utilized both heterodyne frequency conversion and regenerators. Regeneration of the signal is far superior to the heterodyne processors by restoring the signal back to perfect. In the past, translators would receive a less than perfect input signal and then degrade it more. This is even worse when they are in "Daisy Chains".

Now we can correct the digital signals with regenerative transcoders and make the signals perfect each and every time. Present day transcoders are on the expensive side. However, I am told that one manufacturer will have an affordable transcoder by the first quarter of next year. If this proves to be the case, then **I believe the front end of a translator should be a transcoder.** The channel processor does not have the ability to reject adjacent input channels and therefore, could only operate on non-adjacent input channels.

The channel processors have been successful when used to feed 8VSB signals to microwave transmitters for relay only, if the input channels were not adjacent. But they do not have the selectivity needed to extract the signals from the microwave receiver

when used with adjacent channels such as channels 3, 4 & 5. The signals need to be regenerated again at this point.

Page 9 par. 16 of the NPRM

I do not believe local insertion should be considered at this time, as we simply do not have the technology or knowledge to make this determination. Again I will state, translators should only pass through the primary station signal and not try to be a broadcaster, as there is considerable misunderstanding of the complexity of altering the bit-stream in translators. If High Definition Television (HDTV) is to be available to rural communities, the full compliment of the primary station should be kept and repeated. Also, translators need permission from the primary station to re-broadcast their programming and it is highly probable that the primary station would not give their permission if the signal were altered.

Page 10 par. 17 of the NPRM

Microwave and TV translator relays will be one of the key ingredients for the inclusion of translators into the digital world. I support these concepts.

Page 11 par. 20 of the NPRM

Time has already made the distinction between translators and LPTV. As it has been stated, most translators serve smaller communities located beyond the urban or near-urban areas and are located mostly in the western part of the US while LPTV stations are mostly located in or near the more populated areas. For example: The present Salt Lake City Market is 36 and without the translators it slides to 43. While the commission's records show 36 LPTV stations in Utah, in reality, only 9 originate local programming with the remaining ones operating as translators. Only two of these stations are located in the truly rural areas. Each LPTV station should be required to originate some local programming, as intended with the 1980's rule making. I understood it was to create an additional *local* service in addition to the traditional translator service.

Page 11 par. 20

The digital term "program origination" could be defined: "a program encoded by a station for the purpose of providing subscription-free television to the general public and should contain a minimum local video service requirement". We should also recognize that there would be a difference between TV translator and LPTV stations when they begin to operate in digital transmission.

Page 12 par. 23 of the NPRM

I believe the term "subscription-free" is a better term than free-over-the-air and translators should continue to provide this service to the general public.

Page 13 par. 27 of the NPRM

Because of the complexity of this new technology, it is imperative that translator technicians begin to learn and familiarize their-self with digital transmission.

I urge the commission to find a way to authorize additional experimental or special temporary authority permission. Translator licensees need to begin transmitting digital signals, which is now urgently needed if translators are to compete with other digital television signals presently available through satellite and cable head-ends. Rural areas need to begin this transition as quickly as possible. This will set the pace for translators to begin the transition.

Page 14 par. 28, 29 & 30 of the NPRM

All available channels between channel 2 and 69 need to be utilized, even for a short period of time, if TV translators are to survive the transition. The new transcoders, digital processors and lower power translators are frequency-agile and can easily be changed to different channels, as needed. . It is a considerable difference to change large systems of translators to digital operation compared to changing just one or two individual stations.

Page 15 par. 31 & 32 of the NPRM

The adopted protected signal contours for Class A stations seem to be reasonable as stated.

A request for additional experimental authority to continue testing 8VSB television translators for the purpose of determining adjacent channel digital operation was granted on April 28, 2003 and additional call letters were assigned.

These tests have shown that adjacent channel translator operation can easily be obtained when we operate at reduced power from a co-located site. This opens up a whole new world in finding additional spectrum for the transition to digital. We are successful in transmitting digital channels 31, 32, 33 & 34 adjacent to licensed analog channels 35 & 36, at the Cove Mountain location. Three section filters are used on each of the DTV and analog translators. Gary Sgrignoli measured the output power of the DTV translators at the Cove site while he was at this location. The output power after the bandpass mask filters on the digital channels ranged from 2.5 Watts to 6 Watts (average), with an ERP that is 8 dB higher. The power on the two licensed analog translators is 100 Watts (peak) each, with an ERP that is 10 dB higher.

The four DTV channels, adjacent to the two analog channels, have operated six months with out producing errors. The area served is 4 miles wide and 50 miles long and is located 3000 ft. below the Cove Mountain Transmit Site. There is adequate DTV signal into all un-shaded areas via existing outside receive antennas. Most people living in the translator viewing audience already have external outdoor antennas.

My opinion: It is going to be very difficult to obtain satisfactory digital indoor "rabbit-ear" reception in the homes from the low power digital translators. I recommend small outside receive antennas instead of increased power from the translators.

We are told and, our tests confirm, that digital coverage will be the same as analog coverage utilizing only 10% digital power. This allows for more efficient use of the spectrum and also provides "wiggle room" (i.e. margin) during the transition period. Lower power and directional antennas will allow translators to reuse the same channels in close proximity; thus more spectrum is again gained.

Page 19 par. 39 of the NPRM

The selection of conservative D/U interference ratios is important in consideration of efficiently using scarce spectrum. The choice of using a more stringent mask in most cases where first adjacent channels (digital next to analog or digital next to digital) are necessary may provide more channels in a spectrally-challenged market. The NPRM states in paragraph 39 that the D/U ratios found in the Sgrignoli paper "are more restrictive than those given in Section 73.263 (c)" of the rules. However, upon closer examination of the FCC rules and the Sgrignoli paper, it was found that the FCC rules utilized a criteria for interference-limited performance of CCIR-3 subjective impairment rating for interference into analog signals and a threshold of visible (TOV) errors for interference into digital signals. However, the Sgrignoli paper utilized a more conservative interference level of threshold of visibility (TOV) for interference into analog signals and a more conservative interference level of only 0.1 dB of white noise threshold of errors degradation for interference into digital signals. This appears to be the main reason for the more restrictive D/U ratios in the Sgrignoli paper. **Interestingly, the stringent mask used in the Sgrignoli paper was shown to have the same interference protection in the first adjacent channel as the current full service FCC emission mask.**

Page 20 par. 40 of the NPRM

Having multiple emission masks (e.g. two) provides flexibility that allows translator operators to more efficiently utilize spectrum if needed (e.g. in congested urban areas) at modest cost increases while utilizing spare spectrum (e.g. in far remote rural areas) at the lowest cost possible. This can be accomplished by carefully using, when necessary, the analog taboo channels and maintaining appropriate D/U ratios throughout the service area to avoid interference into analog NTSC signals or other DTV signals. As pointed out in detail in the Sgrignoli paper, the D/U interference ratios for first adjacent channel operation depend upon the amount of allowed adjacent channel splatter per emission mask. Therefore, having two emission masks provides the flexibility to better allocate low power DTV translator signals into rural areas with minimal interference.

As an example, if there are no first adjacent analog or digital signals in the area of interest, the simple mask can be applied, even with a higher power translator output, which allows a more cost effective hardware solution. On the other hand, if there is a need to have a first adjacent analog or digital neighbor, the stringent mask can be applied if the expected D/U ratios warrant it.

Page 22 par. 46 of the NPRM

We should continue to use the contour protection method with allowance for Longley-Rice and OET 69-type methods on a waiver basis.

Page 22 par. 48 of the NPRM

It is better engineering and to their advantage to incorporate antenna down-tilt as this provides maximum signal strength to the viewers and reduces interference to the horizon.

Page 23 par. 50 of the NPRM

Interference agreements should continue between the concerned parties.

Page 23 par. 51 of the NPRM

I strongly advocate co-located stations and most translators are co-located. I also agree with paragraphs 52, 53, 54 and 55, as this is exactly what we have been successful in demonstrating with our digital television experimental work. In our experiment, channels 31 & 33 are combined into a single K72314 Kathrein panel and channels 32 & 34 are also combined into an identical single Kathrein panel. These two panels are mounted on a leg of the tower, one above the other, and are spaced 2 inches apart with the same orientation. This provides interference free signals throughout the entire receive area.

Page 25 par. 56 of the NPRM

I believe this a larger problem in the more populated areas and will not be prevalent in rural translator areas. I would agree there is a need to apply this requirement for TV translators in some geographic areas where stations are not co-located.

Page 25 par. 57 of the NPRM

The requirement for all TV translator stations to operate with a frequency offset would be an economical disaster and would very rarely be needed in the rural environment.

Note: The frequency of an 8VSB signal can be measured from the pilot carrier. It is 309.441 kHz above the lower edge of the channel. For example: The lower edge of channel 19 is 500 MHz and the correct frequency for the pilot will be 500.309441 MHz. This should be incorporated in the new rules.

Page 26 par. 58 of the NPRM

I agree with paragraph 58 and have no response to paragraphs 59 & 60.

Page 27, par. 61 & 62 of the NPRM

While the established power limits may be adequate for urban or near urban service, they are extremely high for rural translator service. Rural translators do not require this kind of power and cannot economically justify the needed high power equipment. The County of Wayne, in the state of Utah, operates 32 TV translators and has a population of only 2500 people. With lower digital power, more adjacent channels can be utilized in the rural areas and allows reuse of the same channel more frequently.

The Sgrignoli paper is a very comprehensive document and I fully support this concept. The simple mask is economically feasible for the more remote small communities where adjacent channels are less likely to be used while the more stringent

mask would be adequate for middle-sized rural communities where adjacent channel use might be necessary due to spectrum congestion.

After presenting our results from the experimental tests to translator engineers and technicians across the US, I find that many rural areas are eager to begin DTV transmission with translators. Our tests have shown that additional channels are indeed available, in many rural communities, if we use reduced translator output power.

There is a need to set a standard to measure digital translator output power in the field.

One of the most frequent questions asked at my presentations is "how much power are you running on your tests"? It is interesting that not one chief engineer or field technician has been able to explain how to measure digital translator output-power in the field. Some try to measure it with an average power-meter; such as a Bird model 43, others have used spectrum analyzers and a few mention thermo wattmeters. Very few field technicians have access to a thermo wattmeter and therefore must rely on a spectrum analyzer to measure the power via a calibrated directional coupler. This requires consideration of the directional coupler loss as well as resolution bandwidth and other correction factors within the spectrum analyzer.

Gary Sgrignoli has addressed the proper procedure, in detail, in a book supplied with his Digital VSB Transmission Seminars. I recommend to all TV translator field technicians that if you are planning to change from analog to digital transmission, you should begin to study and gain as much knowledge as you can about this new service. It requires a completely different perspective and you will need to develop a different mind set; it will be needed in the near future.

There is a "ball park" method to calculate this power. The bird wattmeter will read approximately 200% of actual digital power with the out-of-band shoulders 36 dB down; but how well is this meter calibrated and could it be 1 to 2 dB off?

Page 30 par. 71 of the NPRM

I do not believe there is a need for certification of a TV translator. However I agree with the remainder of paragraph 71. Some recommended operational parameters should be <u>recommended</u> for TV translator amplifier alignment. This is where potential critical interference problems can occur. I suggest the shoulder out-of-band splatter to be 36 dB down with a 27 dB signal to noise ratio. Our experience tells us we need a "cushion" to guarantee the translators will continue to operate error-free over all seasons of the year and the new transcoders provide this assurance.

As an example: A technician could install a certified translator and put it in operation, as aligned by the manufacturer. A few days later, lightning strikes and one or more output power devices are destroyed. After repair, a full alignment will be needed to restore the translator to normal operation. This will require the same alignment procedure as if he would realign an older non-certified translator.

One should strive for the out-of-band shoulders to be near 36 dB down at the output of the translator, with a minimum in-band signal to noise ratio of 27 dB. We have been able to accomplish these numbers even with older translator power amplifiers using bi-polar output transistors, while producing 25% of the rated analog power. Picture blocking or freeze-framing of digital signals becomes very irritating to the viewers and often leads to the viewer changing channels.

Page 32 par. 75 & 76 of the NPRM

Our tests have proven that the output power remains very constant when using a transcoder to drive the amplifiers with ambient temperatures varying from 60 degrees F. to 90 degrees F. We have also had the same success, using heterodyne processors. Old translator analog rules anticipated equipment to be installed in the open outdoors and would be subjected to great temperature variations while modern day translators are not installed in these adverse conditions. **I propose the output power of a translator must be maintained and not exceed more than 5% of it's authorized power.** It does not appear it makes any difference if controlled by automatic gain control or output limiting. In some cases we have used both AGC and output limiting together, for the translator.

Page 33 par. 81 of the NPRM

I see no reason for translator certification requirements. The emphasis should be on **maintaining** out-of-band splatter, in-band S/N ratios, constant output power. Additional concerns are symbol clock jitter and filter group delay; the new Zenith transcoder can now correct clock jitter, and also pre-correct for linear distortion, which is mostly caused by the non-constant group delay distortion in the output filter. With all of this new technology, many major technical concerns of the commission will be resolved and the receive signals to the viewers will be enhanced. The new transcoders have the ability to reconstruct the digital signal to perfect and will be affordable by the first quarter in 2004. The remaining technical concerns are now shifted to the power amplifiers.

The channel out- of- band emissions are at least 40 dB down at the output of the new transcoders. The power amplifiers then become the limiting factor to retain linearity. The current output devices in the amplifiers determine the amount of output power that the amplifiers will produce, while maintaining linearity with the shoulders at 36 dB down. The optimum output power of the amplifiers is accomplished through alternate adjustments of level and bias settings of the amplifiers. The emission mask then reduces the remaining out-of-band emissions.

Page 35 & 36 par. 86 & of the NPRM

The new transcoders have the ability to program the call letters of the translator station to be identified. These regenerative translators can be operated in a daisy chain manner where the station identification can be easily changed at each additional translator. **I believe the stations should either be identified by the primary station or identify with a transcoder.** Presently, Utah primary stations identify the call letters and the community of service of every translator station in the state. The present day rules do not require a one-watt analog translator to identify. I believe the new rules should remain the same for the new digital one-watt translators.

An additional viewpoint: Analog rules require translators to be equipped with automatic controls that will place it in a non-radiating condition when no signal is being received on the input channel. I suggest that this rule will no longer will be necessary when regenerative translators operate with digital transmission. The transcoder output remains constant with or without modulation or loss of input signal. A financial burden would be imposed on the translator licensee to add a shutdown feature.

Page 37 par. 92 of the NPRM

I agree with this paragraph regarding minor change displacement applications.

Page 37 Par. 93 of the NPRM

Rural communities cannot compete in an auction, as the highest bidder always wins! An average window consumes nearly four years and under the present rules the last winning applicant does not have to construct the station for another three years. In some cases the station is never built and the channel has been tied up for seven years. **I believe that serious applicants for rural translator service will build that construction permit within one year.**

Page 39 par. 97 of the NPRM

Optimum channel allocation is critical during the DTV transition, especially in the rural areas where most of the translators exist. Spectrum efficiency can be achieved through careful selection of transmission parameters such as ERP, HAAT, adjacent channel (splatter) emission masks, antenna patterns (azimuthal and elevation), and antenna beam tilts. Multiple DTV translators operating at low radiated powers (e.g.< 100 watts, ERP) with either the simple or stringent emission mask (depending upon the existence of a first adjacent channel neighbor) can carefully direct it's signal from mountain-top transmission sites to multiple communities in valleys, avoiding interference to each other and existing analog services. This situation can be further facilitated by techniques such as co-siting multiple translators, sharing common broadband antennas (or pairs of matched broadband antennas, each carrying even or odd channels similar to MMDS systems, and carefully choosing radiated power ratios. In doing so, many of the previously defined analog taboo TV channels may be used during and after the transition, better utilizing precious television spectrum.

Further spectrum savings can be achieved through efficient use of microwave channels (e.g. 7, 11 and 13 GHz), where up to four 6- MHz VSB signals can be reliably placed in a 25 MHz bandwidth. These "microwave backbones", which have also been thoroughly been field tested, can efficiently get DTV signals out of spectrally congested urban areas to remote translator sites where they can be transcoded (restored to pristine condition in digital regenerators) and then converted to terrestrial signals (VHF or UHF) for transmission to rural communities or subsequent translators.

Our tests have been conclusive; we can find many channels for digital conversion if these new translators reduce output power by at least 6 dB below their existing analog

authorizations. A high priority should be placed on facilitating the digital transition of the existing translator service and I agree that this would maximize opportunities for viewers, stimulate DTV set penetration, and also minimize the loss of existing analog program services.

Page 41 par. 103 of the NPRM
I whole-heartily agree with this paragraph!

Page 42 par. 105 of the NPRM
I appreciate the commission's efforts to help with the displacement of translators in both moving authorizations to the core and also by actual or potential interference conflicts. Even though the last window was tailored for rural service, many entrepreneurs found ways to make "end runs" and some 4700 applications were received in that window of July 2000. Translators need a "Rolling One-Day Window" to supply additional television service to rural communities.

Page 43 par. 108 of the NPRM
Because the full compliment of local analog stations have never adequately provided enough local and network programming for rural communities, opportunities should continue to allow this analog service to be included in the rolling one-day window. **However, our greatest interest should be directed toward 8VSB digital service to the viewers.**

Many translator licensees are now confused as to what direction they should be planning for the future, analog or digital. Most are uneasy in trying to compete with analog signals when home satellite and cable head-ends are now being provided with digital feeds. Digital Translators can now provide full 8VSB television signals and can easily compete with these other services. There is little doubt that High Definition Television, multi-channel programming and ancillary data information will be the future for the television service.

End viewers will make that ultimate decision.

Page 46 par. 118 of the NPRM
I believe it will be very difficult to incorporate new rules that will be equally fair to four different services. Translator stations serve rural communities and are passive devices. LPTV stations mostly serve more urban or near urban communities and will have to encode and identify their station. Class A stations primarily serve non-rural cities, and will have to encode their signals, identify the station and keep extensive records. They will also require considerable more transmit output power to serve their community of service with very expensive studio and test equipment being required.

On-channel booster stations are the last included service. They should be contained within the protected contour of the primary station and not require identification other than the primary station. In my opinion, if the booster is merely going to pass the primary station signal, without changing channels, it should become part of the primary stations operation and be licensed as such.

Page 49 par. 126 of the NPRM

Translators will need microwave and terrestrial translator relays to make the transition to Digital, as this frees up input channels and allows additional spectrum for digital transmissions.

Page 49 par. 1-3 of the NPRM

I fully support the petition of the Association of Public Television Stations (LPTV Petitioners).

Page 50 par. 129

I agree with this paragraph.

ADDITIONAL COMMENTS:

I fail to see any reference in the NPRM about 5.1 Dolby sound that can be included in the data transmission of the 8VSB signal. People living beyond the coverage of the primary station should also have the opportunity of receiving this superior audio and should have the opportunity for High Definition Television and Dolby Surround Sound.

The new affordable transcoder will include an agile up-converter with an output power of 13 milliwatt (one volt @ 75 ohms). This is adequate power to provide 8VSB service to many small hamlets as a stand-alone transmitter when using a high gain transmit antenna. It will provide a pristine signal to the viewers with 40 dB out-of-band shoulders and at least 27 dB S/N. No additional power amplifiers would be needed.

It is ironic that authorization can now be acquired to transport the 8VSB signal statewide, via microwave and other means, and authorization cannot be gained to transmit this signal the last mile to the communities.

It will be impossible for all translator stations to convert to digital operation by the end of 2006 unless we can begin now! Many translator licensees are ready to begin to make the transition to digital, both to change an analog translator to digital and also to find a second channel for their existing companion analog allocation. It is of considerable difference to change large systems of translators to digital operation compared to changing just one or two individual stations.

My recommendations and suggestions are the results of 35 continuous months of actual field-testing with 8VSB transmission systems.

The ultimate question: **When** will Translators be Included in the Transition to Digital?

Utah Governor Michael O. Leavitt, has addressed this issue in letters to the FCC, on January 16 and September 26, 2003.
See Exhibits 1 and 2

Respectfully Submitted,

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Monroe, Utah
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Telephone 435-527-3566
FAX 435-527-4041

Nov. 24, 2003

Exhibit 1

STATE OF UTAH

MICHAEL O. LEAVITT
GOVERNOR

OFFICE OF THE GOVERNOR
SALT LAKE CITY
84114-0601

OLENE S. WALKER
LIEUTENANT GOVERNOR

September 26, 2003

Mr. Ken Feree
Chief of the Media Bureau
Federal Communications Commission
445 12th Street S.W.
Washington, DC 20554

Dear Mr. Feree,

I am writing as a follow-up to my January 13, 2003 letter (copy attached) to Barbara Kreisman regarding the future of translator service in rural Utah. I have not received a response to this earlier letter. As this is a significant issue in our state, I am reiterating the necessity of prompt action.

Several events have taken place since my January 13th letter, which will be helpful as you move this process forward. They include:

1. The FCC has accepted public comments for FCC document RM-10666, which requests the Commission to establish a Rural Translator Service. I understand the FCC has completed both the Public Comment Period and the Reply Comment Period for this National Translator Association request. I also understand that out of a total of 57 public responses, only three were negative. Thus, it would appear that the process for developing and implementing the resulting rules should be able to move forward expeditiously. The acceptance of the NTA request (RM-10666) will exempt the translator applicants from auction and allow them to file for new stations, including digital, on a daily basis, which is absolutely necessary if rural viewers are to maintain their service **during** the digital conversion.

2. Our local technicians have proven the new digital television translator technology is available and dependable and can provide HDTV television service to our rural citizens. This has been accomplished through authority from the FCC and some very helpful support from major equipment manufacturers. We now have five experimental digital signals serving the Sevier Valley area of Utah. This is a result of two and a half years of effort proving we can deliver very high quality and dependable DTV pictures for our rural viewers.

An unexpected positive outcome of this experimental effort is the ability to now transmit three 8VSB digital stations on one microwave transmitter/receiver instead of the previous ability to only broadcast one station on a standard FM microwave. This new concept can also include high definition and ancillary data in the bandwidth formally required for one TV broadcast station. However, we need the permanent digital translator rules in order to fully utilize this new service.

3. Utah has reviewed both of its existing statewide microwave and TV translator master plans and confirms they are current and will facilitate the conversion to digital services. But we are not able to implement these plans as we are still waiting for the necessary FCC rules. **Also, potential funding sources are not able to provide funding help without the assurance that the required FCC authorizations will be available when needed.**

4. We are pleased the Commission has responded favorably to a newly adopted Notice of Proposed Rule Making regarding rules, policies, and procedures for digital station operations for LPTV, TV translators, and TV booster stations in their meeting on August 6, 2003; however, we are fearful this will consume an extended amount of time.

I understand the current target date for the end of analog services is 2006. Based on this schedule, we need a minimum of two years lead-time to complete the transition to digital services for our rural citizens. **So the rules need to be available to the translator services by the spring of 2004 in order to not deprive our rural users of their local broadcast television stations.** This schedule will insure they will be able to participate in the transition to digital and high definition multi-streaming services and will open the door for additional data based services. This will also insure that the rural cable companies, who depend on translator feeds for their input signals, will have access to the new digital signals for their distribution systems.

Reiterating my final paragraph from the January 13th letter: Rural communities should be given the opportunity to move forward with technological innovation and the prosperity it brings, or they will be left behind. I urge the FCC to not delay but to act on behalf of rural Utahans and rural Americans.

I respectfully request a response from you indicating your schedule for resolution and confirming that our target date of spring of 2004 for these rules will be achieved.

Respectfully,

Michael O. Leavitt
Governor, State of Utah

cc: Michael K. Powell – Chair of FCC
Kathleen O. Abernathy – Commissioner
Michael J. Copps – Commissioner
Kevin J. Martin – Commissioner
Jonathon S. Adelstein – Commissioner
Barbara Kreisman – Chief of Video Services Division, Mass Media Bureau
Keith Larsen
Hossein Hashemzadeh
Byron St. Clair – President of National Translator Association
Kent Parsons
Laura Hunter
Larry Smith
Michael Petersen

Exhibit 2

MICHAEL O. LEAVITT
GOVERNOR

STATE OF UTAH
OFFICE OF THE GOVERNOR
SALT LAKE CITY
84114-0601

OLENE S. WALKER
LIEUTENANT GOVERNOR

January 13, 2003

Federal Communications Commission
Atten: Barbara Kreisman
Chief of the Video Division
445 12th Street S.W.
Washington, D.C. 20554

Dear Ms. Kreisman:

The FCC has a very important role to play with regard to translator stations in Utah and other parts of the West and its actions will have either a supportive or disruptive influence.

Television viewing, especially in rural areas, must not be interrupted either as a result of the transition to digital television or by efforts to clear those channels for new entrants. I am writing to urge the FCC to work with us to solve this pressing problem by rapidly creating simple and separate rules and regulations that expedite and permit translator stations to upgrade their existing infrastructure to handle digital TV transmission. The FCC should give top priority authorization to translator stations that have the capability and funding to quickly convert their facilities. This approach would also permit the FCC to reasonably manage translator applications that are received from those only serious enough to invest in the necessary modifications.

Without these changes, Utah's entire translator infrastructure is at risk. Our experts have said that some translators undoubtedly will be evicted from their analog spectrum since the FCC currently considers them to be a "secondary" instead of "primary service." This will lead to costly reengineering as they are "bumped" from their existing channels. In response, it is likely that some communities will become frustrated with these costly delays and "relocations" and cease operations of their translators entirely. Because of its rugged topography, Utah in the 1950s, put into place a network of translator stations each dependent upon one another in a "chain" to bring analog broadcast viewing to the rural areas of our state. If one or more translators cease operation for any reason, other communities who depend on the translator network for access to the major broadcast networks could find themselves "in the dark."

How disruptive could this be to rural America? 1.5 million people, according to a National Translator Association study, have access to CBS, NBC and ABC only through

the existence of translator stations. The same is true for 2.3 million viewers of PBS and 2.1 million viewers of FOX.

Disruption of the translator network in Utah not only endangers existing analog broadcasts from the Salt Lake urban area, but also dims the hope of future access to digital and high definition television. Even the possibility of future "broadband-like" download services that could be delivered to the PC via a TV tuner would become a distant dream if the translator network were disrupted. Finally, local cable businesses would also be negatively affected since many of them rely on the translator network for their transmissions.

If the FCC fails to act soon, this inaction will have a long-term irreversible and disproportionate impact on our state. Of the 700 translator stations in the United States, 10% are within Utah and an additional 5% are in Idaho, our northern neighbor.

Rural communities should be given the opportunity to move forward with technological innovation and the prosperity it brings, or they will be left behind. I urge the FCC to not delay but to act on behalf of rural Utahans and rural Americans.

Respectfully,

Michael O. Leavitt
Governor, State of Utah

Cc:
Michael Powell
Keith Larsen
Hossein Hashemzadeh
Senator Orrin Hatch
Senator Robert Bennett
Representative Chris Cannon
Representative Jim Matheson
Representative Rob Bishop